

COUSIN et al
Appl. No. 10/531,481
December 5, 2008

REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 1, 2 and 4-14 are in the case.

I. RESPONSE TO ARGUMENTS

On page 2 of the Action, it is stated that that removal of "the majority of unreacted monomer etc...." is not stated in the claims. However, claim 1 does state that the polymer "has been substantially freed from unreacted monomer". It is clear that "substantially freed" is at least equivalent to the majority being removed.

Reconsideration of this point is respectfully requested.

The comments appearing on page 3 of the Action are not understood. In the prior response, it was argued that U.S. patent 4,958,006 relates to treatment of polymer in an extruder, where the polymer will be molten rather than particulate. The Action asserts that:

"...particulates in molten material is arguably inherent in that a molten material *inherently consist of small particulates.*" (Emphasis in original).

The Action provides no evidence in support of the assertion that molten material "inherently consist [sic] of small particulates". Molten polymer is not particulate. Based on this, one of ordinary skill in this art would not have been motivated to arrive at the presently claimed invention based on the cited prior art. As such, there is no *prima facie* case of obviousness.

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II. RESPONSE TO NEW MATTER REJECTION

The Action contains a new matter rejection in relation to "using an inert gas". Basis for this amendment appears in the description on page 2 where prior art documents GB 1272778 and EP 0047077 are discussed, and it is stated that both disclose removal of undesirable components with "an Inert gas". In the following paragraph (top of page 3), it is stated that

"the present invention is concerned with removal of volatile materials from particulate polymeric materials... which have previously been subjected to at least one process for separation of the unreacted monomer, for example, by processes such as those described in GB-A-1272778 and EP-A-0047077."

In light of this, it is clear that the previous separation process now referred to in the claim may utilize an inert gas, as is disclosed in the two prior art documents mentioned above. No new matter is entered. Withdrawal of this rejection is respectfully requested.

III. THE ANTICIPATION REJECTION

Claims 1, 2, 13 and 14 stand rejected under 35 U.S.C. §102(b) as allegedly anticipated by EP 801081, pages 1-10; or U.S. Patent 3,920,624, columns 1-10; U.S. Patent 4,710,538, columns 1-10, Tables I-V and claims 1,2, 6, 7; or U.S. Patent 4,958,006, columns 1-9. The rejection is respectfully traversed.

As claimed, the of the invention is for the separation of volatile material from particulate polymer which has been substantially freed from unreacted monomer in an earlier separation step using an inert gas. The process comprises (a) feeding the

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particulate polymer to a purge vessel and causing it to move through the vessel in substantially plug-flow mode, (b) heating the particulate polymer in the purge vessel to a temperature greater than 30°C but insufficiently high to cause the particles to become agglomerated, and/or maintaining the polymer at a temperature in this range in the purge vessel, and (c) feeding gas to the purge vessel to remove volatile material therefrom, removing the particulate polymer from the purge vessel. Substantially all of the heating of the particles which occurs in the purge vessel is accomplished by preheating the gas fed into the purge vessel and at least a portion of the gas fed to the purge vessel enters the vessel at one or more points located closer to the top of the vessel than to the bottom.

EP 801081A discloses a two-step process in which the first step involves contacting the polymer with a gaseous polymerization feed, and in the second step it is contacted with an inert-gas containing drying gas. There is no disclosure in this document of feeding at least a portion of the gas into the purge vessel at one or more points located closer to the top of the vessel than to the bottom. The claimed invention is therefore not anticipated by this reference.

US 3,920,624 uses steam rather than gas to remove volatiles from the polymer. The steam contacts the polymer at the bottom of the vessel. Thus, there are two clear process differences from the presently claimed invention which employs a gas rather than steam, and the gas contacts the polymer closer to the top of the vessel rather than at the bottom. The claimed invention is therefore not anticipated by this reference.

US 4,710,538 provides no disclosure that at least a portion of the gas fed to the purge vessel enters the vessel at one or more points located closer to the top of the

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vessel than to the bottom, as required by the presently claimed process. It is also not clear that "substantially all of the heating of the particles which occurs in the purge vessel is accomplished by preheating the gas fed into the purge vessel" (it seems likely that the particles enter the vessel at the temperature of the vessel, and that no additional heating takes place). Neither of these two features is disclosed in US 4,710,538. Moreover, claim 1 requires particulate polymer moving through a purge vessel in plug flow mode. This feature further distinguishes claim 1 from U.S. patent 4,710,538, which concerns a polymerization reactor. The claimed invention is therefore not anticipated by this reference.

US 4,958,006 discloses removing volatiles from a polymer melt in an extruder. In other words, in the process of U.S. patent 4,958,006, the polymer will be molten rather than particulate. This is a completely unrelated process to that of the presently claimed invention. The claimed invention is therefore not anticipated by this reference.

Withdrawal of the outstanding anticipation rejection is now believed to be in order. Such action is respectfully requested.

IV. THE OBVIOUSNESS REJECTION

Claims 1, 2 and 4-14 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over EP 801081, pages 1-10 or U.S. Patent 3,920,624, columns 1-10. That rejection is respectfully traversed.

In the process as claimed, at least a portion of the gas fed to the purge vessel enters the vessel at one or more points located closer to the top of the vessel than to the bottom. As explained at page 8, line 3 onwards of the specification, a benefit of

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adding gas higher up the vessel is that a lower pressure is required, with only a low velocity being required for the remaining gas introduced at the bottom of the vessel, as the polymer is already heated. This results in overall greater efficiency. Neither this feature nor any associated advantage is suggested by any of the cited prior art.

In addition, according to the claimed process, the particulate polymer "has been substantially freed from unreacted monomer in an earlier separation step using an inert gas". This prior separation step is significant because the prior substantial removal of unreacted monomer makes it possible to use any gas (including air) in the volatiles separation aspect of the process. If unreacted monomer is not substantially removed in an earlier separation step using an inert gas, use of air, for example, in the purge vessel to remove the volatiles would result in an unacceptable fire risk. This is a principal reason for using inert gas to devolatilize polymer streams. Moreover, by substantially removing unreacted monomer in the prior separation step, since a large amount of gas is required to reduce the level of volatile components to very low levels, the use of air is much less expensive, thereby reducing overall costs of operating the process.

The present invention is therefore essentially a two-step process in which the majority of the unreacted monomer is removed using an inert gas in a prior separation step, and a further separation is then conducted using any gas, which is typically air but not limited to air, to remove the volatiles. This two step process is not suggested by the cited prior art.

EP 801081 A discloses a two-step process in which, in the first step, the polymer is contacted with a gaseous polymerization feed and, in the second step, the polymer is contacted with an inert-gas containing drying gas. There is no disclosure or suggestion

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In EP 801081 A of feeding at least a portion of the gas into the purge vessel at one or more points located closer to the top of the vessel than to the bottom, as required by claim 1. The benefit of adding some of the gas higher up the vessel is explained in the description on page 8 lines 3 onwards. Thus, this arrangement results in a lower pressure being required, with only a low velocity required for the remaining gas introduced at the bottom of the vessel, as the polymer is already heated, resulting in greater efficiency. This feature and associated advantage are not suggested by any of the cited prior art in this case.

U.S. patent 3,920,624 describes a single step process for stripping residual volatiles from polymer pellets. There is no suggestion of the two step process of the present invention whereby unreacted monomer is first removed using inert gas followed by removal of the volatiles using a gas such as air.

Based on the above, it is clear that one of ordinary skill in this art would not have been motivated to arrive at the presently claimed invention based on the cited prior art. Absent any such motivation, a *prima facie* case of obviousness has not been generated in this case. Withdrawal of the obviousness rejection is accordingly respectfully requested.

V. CLAIM AMENDMENT

Claim 1 has been amended to correct an obvious typographical error. No new matter is entered.

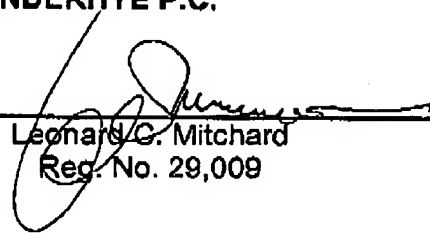
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Favorable action is awaited.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____


Leonard C. Mitchard
Reg. No. 29,009

LCM:iff
901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100